WISDOM IS COMMON SENSE TO AN UNCOMMON DEGREE.

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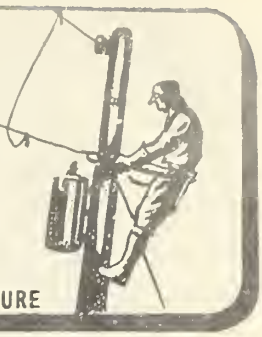
the Lineman

RURAL ELECTRIFICATION ADMINISTRATION - U.S. DEPARTMENT OF AGRICULTURE



SAFE METHODS EXIST FOR EVERY JOB

Florida Lineman Saved After Pole-top Accident

A lineman of the Suwanee Valley Electric Cooperative, Live Oak, Fla., started to install a live-line clamp on a primary conductor which was energized. His left hand was around the pole and in contact with the ground wire. The instant the live-line clamp touched the conductor, the lineman received an electric shock of 7200-volts, hand to hand. He fell head first from the pole.

Line Superintendent A. L. Taylor and another cooperative employee, J. D. Ross, caught the injured lineman and broke his fall so that no serious injury was caused. Taylor immediately started resuscitation.

The injured man was revived in approximately 15 minutes. By this time, Co-op. manager E. N. Butler arrived and took the injured man to the doctor.

The electrical current which had passed through the injured man's body, hand to hand, caused third degree burns in the palm of the right hand which held the clamp, and on the side of the left hand in contact with the ground wire.

Application has been made to the National Safety Council for a life saving award in behalf of Taylor, who actually performed the resuscitation. He has since become the manager of the Tri-County Electric Cooperative at Madison, Florida.

A. L. Taylor

Relocation of Oil Circuit Breakers Results in Fatality

(SEE PHOTOGRAPH-DIAGRAM ON PAGE THREE)

A foreman, who had experience on cold construction only found he could not continue with some construction work he had started since roads were impassable in that area. So he decided to relocate some oil circuit breakers. The pole from which these O.C.B.'s were to be removed (see photograph) has 3-phase, 7200-volt primaries double dead-ended on the top arms. Below this a 7200-volt 2-phase pulls off at right angles. Below these are two 2300-volt dead-ends. The breakers were pole mounted under crossarm (#3).

Two men from the foreman's crew were taken along to assist, but the foreman did the work on the pole. He did not feel that it would be necessary to de-energize any of the circuits. He first climbed to point (#1), safetied off and disconnected the O.C.B.'s with a 5-foot hot-stick.

At this point, one of the crew suggested that he "go get the heavy truck" which was equipped with rubber goods for covering up 2300-volt lines. The foreman did not reply to this question and continued with the work. He installed cut-outs (#4 and #5) and connected them to the load side of the line. He then took his 5-foot hot-stick and connected (#4) cut-out to the line. He was getting the stick ready to close cut-out (#5).

The two men on the ground insisted that (#5) cut-out should not be energized from the position the foreman was in. But the foreman smiled knowingly and continued. The man was standing on arms (#2), straddling the down guy with his belt at point (#8).

He was six feet, two inches tall. The position in which he stood placed his elbows about level with cut-out (#4 and #5).

The primary lead from the cut-out had been hooked over the neutral of the 7200-volt line at point (#6) by use of the live line clamp on the end of the lead. The foremen took his 5-foot shot-gun stick and was working the mechanism to attach the clamp in the end of the stick. As he pulled back on the locking device his right elbow struck the top of cut-out (#4) which was hot (7200 volts). As a result of this shock he fell into the cut-out and made contact with the right side of his chest. He then slumped backwards in his belt. One foot went between the double arms (#2) the other around the pole and he came to rest with his head at point (#9) on the 2300-volt underbuild. In this position he could not be removed until the 2300-volt line was opened at the substation.

DISCUSSION POINTS

1. Is it a safe work practice to work above energized lines?
2. Was this man too close to the cut-outs he was energizing?
3. Is the purpose of an 8-foot hot-stick to provide a safe distance between the lineman and the energized equipment he must operate? (A new 8-foot hot-stick was in the truck).
4. If this job had been completed without an accident, would the workman feel that his method was safe?
5. Did you ever hear the expression "I have always done it that way and got by with it?"
6. Can you afford to attempt a job which you are not qualified to do?

THE LINEMAN is published in the interest of safety for employees of REA-financed systems. Ralph A. C. Hill, Editor
Frank H. LaMaster, Associate Editor

Capacitors on Rural Lines

The use of capacitors on rural lines is becoming quite common. Capacitors introduce certain hazards which should be thoroughly understood by the men who operate and maintain the lines. Failure to observe certain precautions may result in serious injury such as severe electrical shock, electrical burns, or even death. Even though the shock is not sufficient to disfigure or kill, it may cause a fall which can result in serious injury.

There are many types, shapes, sizes and voltage ratings of capacitors. Probably the most familiar is the condenser in the ignition system of the automobile. It is usually called a condenser but it is also a capacitor. Radio sets contain condensers which are also capacitors.

There is nothing new about the principles of the capacitor. The high voltage capacitors being used on rural lines are much the same as the automobile ignition condenser except for the material from which they are made and the voltages involved.

When a capacitor is connected to the line it becomes charged. If the line is killed or the capacitor disconnected, the capacitor remains charged. In fact the instant the capacitor is disconnected from its 7200-volt source of supply, its potential could be much greater than the 7200-volt line voltage.

Capacitors which are disconnected should be shorted and grounded. It is not sufficient to short-out a capacitor momentarily - - this only drains off the free charge of electricity. If the capacitor terminals do not remain shorted out, the absorbed charge of electricity will build up voltage to dangerous proportions.

The disconnecting, shorting and grounding of capacitors should be done with hot-sticks. It is advisable to wait five minutes after a capacitor is disconnected before shorting and grounding the terminals. This five minute waiting period allows some of the charge to drain off and minimizes the arc which will result from the short circuit.

Industrial Data Sheet No. D.P.U. 3 of the National Safety Council, (20 North Wacker Drive, Chicago, Ill.) is excellent for those who want further information on this subject.

CAPACITORS

Remember — even a disconnected capacitor can contain a dangerous electric charge.

1. Disconnect the capacitor in the way your supervisor has told you.
2. Be sure it is **completely** disconnected.
3. Make certain that each unit is grounded and short-circuited.
4. If there is no permanent ground, apply a temporary ground to the capacitor case.
5. Allow ample time for the residual charge to be drained off.
6. If possible, keep the grounding and short-circuiting devices connected until you are through working on the capacitor.
7. Never remove these devices until the capacitor charge is completely drained.
8. Never depend on the built-in discharge resistor alone to drain off the residual charge.
9. Short-circuit the terminals of capacitors before moving or storing them.

SAFETY INSTRUCTION CARD No. 610
National Safety Council

HOW ABOUT POSITION

A lineman climbed a pole to change out an insulator on a dead line. Another lineman was to open the line a short distance away but had not done so at the tire the first lineman belted off. The first lineman was merely getting in position to do the job as soon as the line was dead. He was belting off when he lost his balance and fell into the hot primary conductor. He suffered severe electrical burns on the right shoulder and both feet. As a result of the shock, he fell from the pole receiving severe internal injuries from the fall. The injuries resulted in permanent disability but were not fatal.

DISCUSSION POINTS

1. Is it a safe work practice to use a work position in which you can fall into an energized conductor if you slip or something unexpected happens?
2. Before getting as high on the pole as the injured apparently was, would you require a protective ground installed on each side of you?
3. How much time was saved by getting in position before the line was killed and grounded?
4. If one man can get hurt doing a job in this manner, could you also get hurt doing the same job the same way?

HARD LUCK HARRY

"IF YOU READERS DON'T SEND ME SOME IDEAS, I'LL SOON BE OUT OF A JOB. SURE WOULD LIKE TO HEAR FROM YA."

NOTICE

Due to the absence of the Editor from Washington, and the extended illness of the Associate Editor, The Lineman was not published during the months of March and April.

GROUND OUT NEW CONSTRUCTION

The following quotation is from an accident report of a commercial utility company. It is reprinted here because it forsefully states what can happen where lines cross each other.

It also demonstrates how good grounding practices save lives and property, and avoid equipment damage.

"DEFECTIVE EYE BOLT DROPS 60 KV CONDUCTOR"

"A transmission line crew was preparing to change out flashed over OB 25620 insulators, with live line maintenance tools, on a 60-KV H-frame line. The wind was blowing hard enough to cause conductor and insulator string to swing toward the pole. To counter act this, a fuzz line was installed on the conductor to be worked on, and the insulator string was pulled away from the pole. The lift and gin pole were being attached to the conductor when the nut slipped off the eye bolt supporting the insulator string, which allowed the conductor and insulator string to fall to the ground and cross a 7200-volt rural line under construction. The threads on the bolt and nut had rusted away. There was no personal injury to any of our employees, and no apparent damage to our 60-KV conductors. The 7200-volt line was solidly grounded and no workmen were working on it. No damage was done to this equipment other than slight damage tc conductors at point of contact which were cut out.

A similar accident occured last year when the conductor fell across a fence and burned a groundman.

A study is being made of this problem on transmission lines to try to determine if these were isolated cases or if something is going to have to be done to safeguard against this potential hazard."

Any conductors running parallel or crossing over or under other energized conductors are subject to the full voltage of the energized circuits. Had this rural distribution line not been grounded, considerable damage would have resulted. These two accidents prove the value of good grounding devices. For complete protection at all times, lines under construction, as well as those killed out for maintenance, must be solidly grounded. When a dead end is installed for a new extension, ground the conductor before proceeding with the work. When several spans or miles of line are down, as the result of an ice storm or tornado, ground the line first, and leave it grounded until it is ready to be energized.

A few turns of No. 6 copper around the primary and neutral is not enough. Use your screw type ground clamps.

CORRECTION

We regret very much an error which occured in the February issue of The Lineman. In setting the type, one complete line was left out of discussion point number three, page four. This paragraph should have read:

3. In removing a protective ground or other ground wire, it should first be disconnected from the equipment or conductor. It can then be safely disconnected from the ground rod or other attachment which is in contact with the earth. Under certain conditions why would it be hazardous to remove the ground connection first?